CPC COOPERATIVE PATENT CLASSIFICATION

F24F AIR-CONDITIONING, AIR-HUMIDIFICATION, VENTILATION, USE OF AIR CURRENTS FOR SCREENING (devices for ventilating greenhouses A01G { F24F 9/24; air-conditioning systems for greenhouses A01G 9/246 }; animal husbandry A01K , e.g. controlling humidity in incubators A01K 41/04; disinfecting or sterilising of air A61L ; devices for reconditioning breathing air in sealed rooms or for ventilating gas-proof shelters A62B ; filtering, washing or drying of gases B01D ; mixing gases with vapours or liquids in general B01F 3/00; spraying B05B , B05D ; removing dirt or fumes from areas where they are produced B08B 15/00; ventilation, air-conditioning or cooling, specially adapted for vehicles, see the relevant vehicle places, e.g. B60H , B61D 27/00, { B64D 13/00 }; production of ozone C01B 13/10; chimneys or flues E04F 17/02, E04H 12/28, F23J 11/00, F23L 17/02; air ducts or conduits E0417/04, F16L ; ventilation in doors or windows E06B 7/02; fans, blowers F04 ; noise-absorbing in pipes or pipe systems F16L ; tops for chimneys and ventilating shafts F23L ; cooling F25 ; details of heat-exchange or heat-transfer apparatus, of general application F28F ; apparatus for generating ions to be introduced into non-enclosed gases, e.g. the atmosphere H01T 23/00)

NOTE

In this subclass:

- air-humidification as auxiliary treatment in air-conditioning, i.e. in units wherein the air is also either cooled or heated, is covered by groups F24F 1/00 or F24F 3/14;
- air-humidification per se, e.g. "room humidifiers", is covered by group F24F 6/00.

In this subclass, the following terms or expressions are used with the meanings indicated:

- "air-conditioning" means the supply of air to rooms or spaces by means which provide for the treatment of the air in at least two of the following ways: heating - cooling - any other kind of treatment, e.g. humidification.

Guide heading: **Air-conditioning**

F24F 1/00 Rooms units, e.g. receiving primary air from a central station { or with supply of heating or cooling agents from a central station, such as those applied to air-treatment systems included in F24F 3/00 and F24F 5/00 (arrangement or assembly of components for the primary treatment of air F24F 11/08; mixing chambers for air F24F 13/04) }

WARNING

F24F 1/08 to F24F 1/24 and F24F 1/28 to F24F 1/68 not complete pending the completion of a reclassification; see also other groups of F24F 1/00

F24F 1/0003 . {Split units }

F24F 1/0007 . {Fan coil units, e.g. using an evaporating refrigerant }
F24F 1/0011 . . {characterised by the air outlet }
F24F 1/0014 . . . { with two or more blow out openings }
F24F 1/0018 . . { characterised by the fan }
F24F 1/0022 . . . { Centrifugal or radial fan }
F24F 1/0025 . . . { Cross flow or tangential fan }
F24F 1/0029 . . . { Axial fan }
F24F 1/0033 . . . { comprising two or more fans }

F24F 1/0059 . {characterised by the heat exchanger }

F24F 1/01 . in which secondary air is induced by injector action of the primary air (F24F 1/02 takes precedence; {arrangement or assembly of or components for the regulation of the air supply through a heat exchanger and the associated bypass for the secondary treatment of the air F24F 11/027; nozzle for induction unit F24F 13/26 })

F24F 1/02 . self-contained, i.e. with all apparatus for treatment installed in a common casing { (arrangement or assembly of components for the primary treatment of air in independent units F24F 11/08B) }
F24F 1/022 . . {Comprising a compressor cycle }
F24F 1/025 . . . {Portable }
F24F 1/027 . . . {mounted in wall openings, e.g. in windows }
F24F 1/04 . . Arrangements for portability

F24F 1/06 . Separate outdoor units, e.g. outdoor unit to be linked to a separate room comprising a compressor and a heat exchanger

NOTE

In this group, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.

F24F 1/08 . . Compressors specially adapted for separate outdoor units
F24F 1/10 . . . Arrangement or mounting thereof
F24F 1/12 . . . Vibration or noise prevention thereof
F24F 1/14 . . Heat exchangers specially adapted tor separate outdoor units
F24F 1/16 . . . Arrangement or mounting thereof
F24F 1/18 . . . characterized by their shape
F24F 1/20 . . Electric components for separate outdoor units
F24F 1/22 . . . Arrangement or mounting thereof
F24F 1/24 . . . Cooling of electric components
F24F 1/26 . . Refrigerant piping
F24F 1/28 . . . for connecting several separate outdoor units
F24F 1/30 . . . for use inside the separate outdoor units
F24F 1/32 . . . for connecting the separate outdoor units to indoor units

F24F 1/34 . . . Protection means thereof, e.g. covers for refrigerant pipes
F24F 1/36 . . Drip trays for outdoor units
F24F 1/38 . . Fan details of outdoor units, e.g. bell-mouth shaped inlets of fan mountings
F24F 1/40 . . Vibration or noise prevention at outdoor units (for outdoor units compressors F24F 1/12)
F24F 1/42 . . characterized by the use of the condensate, e.g. for enhanced cooling
F24F 1/44 . . characterized by the use of internal combustion engines
F24F 1/46 . . Component arrangements in separate outdoor units
F24F 1/48 . . . characterized by air airflow, e.g. inlet or outlet airflow
F24F 1/50 . . . . with outlet air in upward direction
F24F 1/52 . . . . with inlet and outlet arranged on the same side, e.g. for mounting in a wall opening
F24F 1/54 . . . . Inlet and outlet arranged on opposite sides
F24F 1/56 . . Casing or covers of separate outdoor units, e.g. fan guards
F24F 1/58 . . . Separate protective covers for outdoor units, e.g. solar guards, snow shields or camouflage
F24F 1/60 . . Arrangement or mounting of the outdoor unit
F24F 1/62 . . . Wall-mounted
F24F 1/64 . . . Ceiling-mounted, e.g. below a balcony
F24F 1/66 . . . under the floor level
F24F 1/68 . . . Arrangement of multiple separate outdoor units

F24F 3/00 **Air-conditioning systems in which conditioned primary air is supplied from one or more central stations to distributing units in the rooms or spaces where it may receive secondary treatment**
Apparatus specially designed for such systems (room units F24F 1/00; construction of heat-exchangers F28) {F24F 3/044 takes precedence; arrangement or assembly of components for the primary treatment of air F24F 11/08 }

F24F 3/001 . { in which the air treatment in the central station takes place by means of a heat-pump or by means of a reversible cycle (regulation of heat-pump circuit in air treatment systems F25B 29/00; heat pumps F25B 13/00, F25B 29/00; reversible cycle for humidifying and drying air F24F 3/147) }

F24F 3/02 . characterised by the pressure or velocity of the primary air (F24F 3/044 takes precedence)
F24F 3/04 . . operating with high pressure or high velocity

F24F 3/044 . Systems in which all treatment is given in the central station, i.e. all-air systems
F24F 3/0442 . . {with volume control at a constant temperature }
F24F 3/0444 . . . {in which two airstreams are conducted from the central station via independent conduits to the space to be treated, of which one has a constant volume and a season-adapted temperature to compensate for the fluctuating heat transfer losses of the building, while the other varies in volume and is always cold in order to compensate for the interior fluctuations and variable solar heating effects, i.e so-called "Dual Conduit System"; this system is similar to a high-pressure air-water system }
F24F 3/048 . . with temperature control at constant rate of air-flow (F24F 3/056 takes precedence)

F24F 3/052 . . . Multiple duct systems, e.g. systems in which hot and cold air are supplied by separate circuits from the central station to mixing chambers in the spaces to be conditioned

F24F 3/0522 . . . . {in which warm or cold air from the central station is delivered via individual pipes to mixing chambers in the space to be treated, the cold air/warm air ratio being controlled by a thermostat in the space concerned, i.e so-called Dual-duct System }

F24F 3/0525 . . . . {in which the air treated in the central station is reheated; this may take place near the central station upon arrival, in the space to be treated, in a branch pipe to zone in a multi-zone system or in the warm pipe in a system having separate supply conduits for warm and cold air }

F24F 3/0527 . . . . {in which treated air having differing temperatures is conducted through independent conduits from the central station to various spaces to be treated, i.e so-called "multi-Zone" system; (F24F 3/0525 takes precedence) }

F24F 3/056 . . the air at least partially flowing over lighting fixtures, the heat of which is dissipated or used

F24F 3/06 . characterised by the arrangements for the supply of heat-exchange fluid for the subsequent treatment of primary air in the room units (F24F 3/02 takes precedence) {Arrangement or assembly of components for the regulation of the supply of heating or cooling media for the secondary treatment of air F24F 11/06 }

F24F 3/065 . . {with a plurality of evaporators or condensers }

F24F 3/08 . . with separate supply and return lines for hot and cold heat-exchange fluids {i.e so-called "4-conduit" system }

F24F 3/10 . . with separate supply lines and common return line for hot and cold heat-exchange fluids {i.e so-called "3-conduit" system }

F24F 3/12 . characterised by the treatment of the air otherwise than by heating and cooling (F24F 3/02, F24F 3/06 take precedence, apparatus for the individual treatment, see the appropriate subclasses for the treatments)

F24F 3/14 . . by humidification
by dehumidification

F24F 3/1405 . . . {in which the humidity of the air is exclusively affected by contact with the evaporator of a closed-circuit cooling system or heat pump circuit }

F24F 3/1411 . . . {by absorbing or adsorbing water, e.g. using an hygroscopic desiccant }

F24F 3/1417 . . . . {with liquid hygroscopic desiccants }

F24F 3/1423 . . . . {with a moving bed of solid desiccants, e.g. a rotary wheel supporting solid desiccants }

F24F 3/1429 . . . . { alternatively operating a heat exchanger in an absorbing/adsorbing mode and a heat exchanger in a regeneration mode }

F24F 3/147 . . . with both heat and humidity transfer between supplied and exhausted air

F24F 3/153 . . . with subsequent heating, i.e. with the air, given the required humidity in the central station, passing a heating element to achieve the required temperature

F24F 3/16 . . by purification, e.g. by filtering
by sterilisation
by ozonisation {ion sources H01J 27/02, H01J 37/08; treatment rooms or enclosures for medical purposes A61G 10/00 }

F24F 3/1603 . . . {by filtering (arrangements or mounting of filters F24F 13/28) }

F24F 3/1607 . . . . {Clean air work stations, i.e. selected areas within a space to which filtered air is passed (means providing sterile air at a surgical operation table or area A61G 13/108) }

F24F 3/161 . . . . {Clean rooms, i.e. enclosed spaces in which a uniform flow of filtered air is distributed (air distribution by perforated walls F24F 7/10; dust-free rooms or enclosures applicable solely to laboratory purposes B01L 1/04) }

F24F 3/166 . . . {using electric means, e.g. applying electrostatic field (using thermo-electric means F24F 5/0042) }

F24F 5/00 **Air-conditioning systems or apparatus not covered by F24F 1/00 or F24F 3/00** { e.g. using solar heat; combined with household units such as an oven or water heater }

F24F 5/0003 . {Exclusively-fluid systems }

F24F 5/0007 . {cooling apparatus specially adapted for use in air-conditioning (self-contained room units F24F 1/02; F24F 5/0046 takes precedence; air-humidification F24F 6/00) }

F24F 5/001 . . {Compression cycle type }

F24F 5/0014 . . {using absorption or desorption }

F24F 5/0017 . . {using cold storage bodies, e.g. ice }

F24F 5/0021 . . . { using phase change material [PCM } for storage]

F24F 5/0035 . . {using evaporation }

F24F 5/0042 . {characterised by the application of thermo-electric units or the Peltier effect (refrigerators and cooling systems using magnetic or electrical effects in general F25B 21/02; for semi-conductors H01L 23/38; thermobatteries or thermogenerators H01L 35/00) }

F24F 5/0046 . {using natural energy, e.g. solar energy, energy from the ground }

F24F 5/005 . . { using energy from the ground by air circulation, e.g. "Canadian well" }

F24F 5/0071 . {adapted for use in covered swimming pools }

F24F 5/0075 . {Systems using thermal walls, e.g. double window (double windows per se E06B) }

F24F 5/0085 . { Systems using a compressed air circuit (B64D 13/00, B60H take precedence) }

F24F 5/0089 . {Systems using radiation from walls or panels }

F24F 5/0092 . . { ceilings, e.g. cool ceilings }

F24F 5/0096 . {combined with domestic apparatus }

F24F 6/00 **Air-humidification, e.g. for increasing comfort in living spaces by "room humidifiers"** { cooling by humidification }

F24F 6/02 . by evaporation of water in the air {humidifiers specially adapted for radiators see F24D 19/008 }

F24F 6/025 . . { using electrical heating means (F24F 6/105 takes precedence) }

F24F 6/04 . . using stationary unheated wet elements

F24F 6/043 . . . {with self-sucking action, e.g. wicks (humidificators for radiators F24D 19/008) }

F24F 6/06 . . using moving unheated wet elements

F24F 6/08 . . using heated wet elements

F24F 6/10 . . . heated electrically

F24F 6/105 . . . . {using the heat of lamps }

F24F 6/12 . by forming water dispersions in the air

F24F 6/14 . . using nozzles (nozzles per se, spraying in general B05B)

F24F 6/16 . . using rotating elements

F24F 6/18 . by injection of steam into the air

F24F 7/00 **Ventilation,** { e.g. by means of wall-ducts; systems using window or roof apertures }

F24F 7/007 . with forced flow (using ducting systems F24F 7/06)

F24F 7/013 . . using wall or window fans, displacing air through the wall or window {possibly through a grill or through a shutter or flap (with heating elements F24F 3/00 to F24F 3/14; ventilators with provision for recirculating air or piping it away F24F 7/06; room ventilators, portable ventilators F04D 25/08) }

F24F 7/02 . Roof ventilation (F24F 7/007 takes precedence; ventilation of roof coverings E04D)

F24F 7/025 . . {with forced air circulation by means of a built-in ventilator }

F24F 7/04 . with ducting systems {also by double walls; with natural circulation (F24F 7/02 takes precedence) }

F24F 7/06 . . with forced air circulation, e.g. by fan {positioning of a ventilator in or against a conduit (ventilators per se F04D 25/08) }

F24F 7/065 . . . {fan combined with single duct; mounting arrangements of a fan in a duct (construction of fans F04D) }

F24F 7/08 . . . with separate ducts for supplied and exhausted air {with provisions for reversal of the input and output systems }

F24F 7/10 . . . with air supply, or exhaust, through perforated wall, floor or ceiling, (outlet members for directing or distributing air {into rooms or spaces, e.g. ceiling air-diffusers } F24F 13/06)

F24F 9/00 **Use of air currents for screening, e.g. air curtain** (air curtains for vehicles B60J 9/04)

Guide heading: **Common features or details**

F24F 11/00 **Control or safety systems or apparatus** ({extinguishing or preventing fire A62C 3/14 }; control valves per se F16K ; humidity control G05D 22/00)

F24F 11/0001 . {for ventilation (F24F 11/0009 takes precedence) }

F24F 11/0008 . {for air-humidification (F24F 11/0009 takes precedence) }

F24F 11/0009 . {Electrical control or safety systems or apparatus }

F24F 11/001 . . {Control systems or circuits characterised by their inputs, e.g. using sensors }

F24F 11/0012 . . . {Air temperature }

F24F 11/0015 . . . {Air humidity }

F24F 11/0017 . . . {Air quality properties }

F24F 11/0034 . . . {Occupancy }

F24F 11/006 . . {Control systems or circuits characterised by type of control, internal processing or calculations, e.g. using fuzzy logic adaptative control or estimating values }

F24F 11/0076 . . {Control systems or circuits characterised by their outputs, e.g. using a variable flow fan }

F24F 11/0078 . . . {controlling the angle of the air stream }

F24F 11/0079 . . . {controlling the speed of ventilators }

F24F 11/008 . . . {controlling the supply of heat-exchange fluid }

F24F 11/0086 . . {Control systems or circuits characterised by other control features, e.g. display or monitoring devices }

F24F 11/02 . Arrangements or mounting of control or safety devices

F24F 11/022 . . {for the control of flow conditions, e.g. pressure, velocity }

F24F 11/025 . . . {characterised by velocity control }

F24F 11/027 . . {exclusively for controlling the air supply to a heat-exchanger or the ancillary bypass (F24F 11/08 takes precedence) }

F24F 11/04 . . solely for controlling the rate of air-flow (F24F 11/08 takes precedence)

F24F 11/043 . . . {dependent on air-current or wind pressure (F24F 11/04 takes precedence) }

F24F 11/047 . . . to constant value

F24F 11/053 . . . by means responsive to temperature

F24F 11/06 . . solely for controlling the supply of heating or cooling fluids for secondary treatment (F24F 11/08 takes precedence)

F24F 11/08 . . for controlling the primary treatment of air

F24F 11/085 . . . {in independent units }

F24F 12/00 **Use of energy recovery systems in air conditioning, ventilation or screening** (with both heat and humidity transfer between supplied and exhausted air F24F 3/147; heat-exchange in general F28)

F24F 12/001 . {with heat-exchange between supplied and exhausted air }

F24F 12/002 . . {using an intermediate heat-transfer fluid }

F24F 12/003 . . . {using a heat pump }

F24F 12/006 . . {using an air-to-air heat exhanger (F24F 12/002 takes precedence) }

F24F 13/00 **Details common to, or for air-conditioning, air-humidification, ventilation or use of air currents for screening**

F24F 13/02 . Ducting arrangements

F24F 13/0209 . . { characterised by their connecting mens, e.g. flanges }

F24F 13/0218 . . { Flexible soft ducts, e.g. ducts made of permeable textiles }

F24F 13/0227 . . { using parts of the building, e.g. air ducts inside the floor, walls or ceiling of a building (air ducts or channels of buildings E04F 17/04) }

F24F 13/0236 . . { with ducts including air distributors, e.g. air collecting boxes with at least three openings }

F24F 13/0245 . . { Manufacturing or assembly of air ducts; Methods therefor }

F24F 13/0254 . . { characterised by their mounting means, e.g. supports }

F24F 13/0263 . . { Insulation for air ducts }

F24F 13/0272 . . { Modules for easy installation or transport }

F24F 13/0281 . . { Multilayer duct }

F24F 13/029 . . { Duct comprising an opening for inspection, e.g. manhole }

F24F 13/04 . . Air mixing units (F24F 13/06 takes precedence; mixing gases in general B01F 3/02) {room units for the mixing of pre-treated primary air with recirculated or room air F24F 1/00 }

F24F 13/06 . . Outlets for directing or distributing air into rooms or spaces, e.g. ceiling air diffuser

F24F 13/0604 . . . {integrated in or forming part of furniture }

F24F 13/062 . . . having one or more bowls or cones diverging in the flow direction (F24F 13/072 takes precedence)

F24F 13/065 . . . formed as cylindrical or spherical bodies which are rotatable (F24F 13/072 takes precedence)

F24F 13/068 . . . formed as perforated walls, ceilings or floors (F24F 13/078 takes precedence)

F24F 13/072 . . . of elongated shape, e.g. between ceiling panels

F24F 13/075 . . . having parallel rods or lamellae directing the outflow, e.g. the rods or lamellae being individually adjustable (F24F 13/072 takes precedence)

F24F 13/078 . . . combined with lighting fixtures (air-treatment systems with air-flow over lighting fixtures F24F 3/056)

F24F 13/08 . Air-flow control members, e.g. louvres, grilles, flaps, guide plates (F24F 13/06 takes precedence; roof ventilators F24F 7/02)

F24F 13/081 . . {for guiding air around a curve }

F24F 13/082 . . {Grilles, registers or guards }

F24F 13/084 . . . {with mounting arrangements, e.g. snap fasteners for mounting to the wall or duct }

F24F 13/085 . . . {including an air filter }

F24F 13/10 . . movable, e.g. damper (F24F 13/18 takes precedence; valves in general F16K)

F24F 13/105 . . . {composed of diaphragms or segments }

F24F 13/12 . . . built up of sliding members

F24F 13/14 . . . built up of tilting members, e.g. louvre

F24F 13/1406 . . . . {characterised by sealing means }

F24F 13/1413 . . . . {using more than one tilting member, e.g. with several pivoting blades (F24F 13/15 takes precedence) }

F24F 13/142 . . . . {using pivoting blades with intersecting axles }

F24F 13/1426 . . . . {characterised by actuating means }

F24F 13/1486 . . . . {characterised by bearings, pivots or hinges }

F24F 13/15 . . . . with parallel simultaneously tiltable lamellae

F24F 13/16 . . . built up of parallelly-movable plates

F24F 13/18 . . specially adapted for insertion in flat panels, e.g. in door or window-pane

F24F 13/20 . Casings or covers

F24F 13/22 . Means for preventing condensation or evacuating condensate { (for refrigerating

devices in general F25D 21/14) }

F24F 13/222 . . {for evacuating condensate }

F24F 13/224 . . . {in a window-type room air conditioner }

F24F 13/24 . Means for preventing or suppressing noise { (in perforated ceilings F24F 7/10) }

F24F 13/26 . Arrangements for air-circulation by means of induction, e.g. by fluid coupling or thermal effect

F24F 13/28 . Arrangement or mounting of filters

F24F 13/30 . Arrangement or mounting of heat-exchangers

F24F 13/32 . Supports for air-conditioning, air-humidification or ventilation units

Guide heading:

F24F 2001/00 **Rooms units, e.g. receiving primary air from a central station** { or with supply of heating or cooling agents from a central station, such as those applied to air-treatment systems included in F24F 3/00 and F24F 5/00 (arrangement or assembly of components for the primary treatment of air F24F 11/08; mixing chambers for air F24F 13/04) }

WARNING

F24F 1/08 to F24F 1/24 and F24F 1/28 to F24F 1/68 not complete pending the completion of a reclassification; see also other groups of F24F 1/00

F24F 2001/0007 . {Fan coil units, e.g. using an evaporating refrigerant }

F24F 2001/0037 . . mounted in or under the ceiling

F24F 2001/004 . . mounted or standing on the floor

F24F 2001/0044 . . mounted at least partially under the floor or the outlet air is being distributed under the floor (HVAC with raised floors F24F 2221/40)

F24F 2001/0048 . . mounted in or on the wall

F24F 2001/0051 . . Introducing outside air to rooms

F24F 2001/0055 . . Exhausting internal air from rooms

F24F 2001/0062 . receiving air from a central station

F24F 2001/0066 . . with air treatment in the central station and in the room unit

F24F 2001/007 . . with air treatment in the room unit

F24F 2001/0074 . receiving heat exchange fluid

F24F 2001/0077 . . the fluid entering and leaving the room unit as a liquid

F24F 2001/0081 . . the fluid entering the room unit as a liquid and leaving it as a gas

F24F 2001/0085 . using the cooling effect of evaporating fluid either evaporating directly in the room air, in the air supplied to the room or in the outside air

F24F 2001/0088 . . evaporating directly in the room air or the air supplied to the room

F24F 2001/0092 . . evaporating in the outside air, e.g. evaporation heat being extracted from the room air by indirect heat exchange

F24F 2001/0096 . Units supplying highly filtered air to a room or to a limited area within a room

F24F 2003/00 **Air-conditioning systems in which conditioned primary air is supplied from one or more central stations to distributing units in the rooms or spaces where it may receive secondary treatment**
Apparatus specially designed for such systems (room units F24F 1/00; construction of heat-exchangers F28) {F24F 3/044 takes precedence; arrangement or assembly of components for the primary treatment of air F24F 11/08 }

F24F 2003/003 . with primary air treatment in the central station and subsequent secondary air treatment in air treatment units located in or near the rooms

F24F 2003/005 . . with a single air duct for transporting treated primary air from the central station to air treatment units located in or near the rooms

F24F 2003/006 . . with two air ducts for separately transporting treated hot and cold primary air from the central station to air treatment units located in or near the rooms

F24F 2003/008 . Supplying highly filtered air to a room or to a limited area within a room

F24F 2003/044 . Systems in which all treatment is given in the central station, i.e. all-air systems

F24F 2003/0446 . . with a single air duct for transporting treated air from the central station to the rooms

F24F 2003/0448 . . with two air ducts for separately transporting treated hot and cold air from the central station to the rooms

F24F 2003/12 . characterised by the treatment of the air otherwise than by heating and cooling (F24F 3/02, F24F 3/06 take precedence, apparatus for the individual treatment, see the appropriate subclasses for the treatments)

F24F 2003/14 . . by humidification
by dehumidification

F24F 2003/1435 . . . comprising semi-permeable membrane

F24F 2003/144 . . . by dehumidification only

F24F 2003/1446 . . . . by condensing

F24F 2003/1452 . . . . . heat extracted from the humid air for condensing is returned to the dried air

F24F 2003/1458 . . . using regenerators

F24F 2003/1464 . . . . using rotating regenerators

F24F 2003/16 . . by purification, e.g. by filtering
by sterilisation
by ozonisation {ion sources H01J 27/02, H01J 37/08; treatment rooms or enclosures for medical purposes A61G 10/00 }

F24F 2003/1603 . . . {by filtering (arrangements or mounting of filters F24F 13/28) }

F24F 2003/1614 . . . . using a dry filtering element

F24F 2003/1617 . . . . using wet filtering methods

F24F 2003/1621 . . . . using chemical filtering methods

F24F 2003/1625 . . . . . using active carbon

F24F 2003/1628 . . . . . using catalytic reaction

F24F 2003/1632 . . . . using vortex
F24F 2003/1635 . . . . using high voltage
F24F 2003/1639 . . . . with filter cleaning
F24F 2003/1642 . . . . of pollen, to avoid allergies
F24F 2003/1646 . . . . of tobacco smoke
F24F 2003/165 . . . . of ozone
F24F 2003/1653 . . . . using biofilters, plants or microorganisms
F24F 2003/1657 . . . . the air pollution of a street or a city
F24F 2003/1664 . . . by sterilisation
F24F 2003/1667 . . . . using UV light
F24F 2003/1671 . . . . using ozone
F24F 2003/1675 . . . . using a sterilising medium
F24F 2003/1678 . . . . to avoid the Legionella bacteria
F24F 2003/1682 . . . by ionisation
F24F 2003/1685 . . . by ozonisation
F24F 2003/1689 . . . by odorising
F24F 2003/1692 . . . by adding oxygen
F24F 2003/1696 . . . by removing radon

F24F 2005/00 **Air-conditioning systems or apparatus not covered by F24F 1/00 or F24F 3/00** { e.g. using solar heat; combined with household units such as an oven or water heater }

F24F 2005/0007 . {cooling apparatus specially adapted for use in air-conditioning (self-contained room units F24F 1/02; F24F 5/0046 takes precedence; air-humidification F24F 6/00) }
F24F 2005/0017 . . {using cold storage bodies, e.g. ice }
F24F 2005/0025 . . . using heat exchange fluid storage tanks
F24F 2005/0028 . . . using hydridable metals as energy storage media
F24F 2005/0032 . . . Systems storing energy during the night
F24F 2005/0039 . . using a cryogen, e.g. CO2 liquid or N2 liquid

F24F 2005/0046 . {using natural energy, e.g. solar energy, energy from the ground }
F24F 2005/0053 . . receiving heat-exchange fluid from a well
F24F 2005/0057 . . receiving heat-exchange fluid from a closed circuit in the ground
F24F 2005/006 . . receiving heat-exchange fluid from the drinking or sanitary water supply circuit
F24F 2005/0064 . . using solar energy
F24F 2005/0067 . . . with photovoltaic panels

F24F 2005/0075 . {Systems using thermal walls, e.g. double window (double windows per se E06B) }
F24F 2005/0078 . . Double windows
F24F 2005/0082 . . Facades

F24F 2006/00 **Air-humidification, e.g. for increasing comfort in living spaces by "room humidifiers"** { cooling by humidification }

F24F 2006/001 . using a water curtain

F24F 2006/003 . using a decorative fountain

F24F 2006/005 . using plants

F24F 2006/006 . with water treatment

F24F 2006/008 . Air-humidifier with water reservoir

F24F 2006/02 . by evaporation of water in the air {humidifiers specially adapted for radiators see F24D 19/008 }

F24F 2006/04 . . using stationary unheated wet elements

F24F 2006/046 . . . with a water pump

F24F 2006/06 . . using moving unheated wet elements

F24F 2006/065 . . . using slowly rotating discs for evaporation

F24F 2006/12 . by forming water dispersions in the air

F24F 2006/14 . . using nozzles (nozzles per se, spraying in general B05B)

F24F 2006/143 . . . using pressurised air for spraying

F24F 2006/146 . . . using pressurised water for spraying

F24F 2007/00 **Ventilation,** { e.g. by means of wall-ducts; systems using window or roof apertures }

F24F 2007/001 . with exhausting air ducts

F24F 2007/002 . . Junction box, e.g. for ducts from kitchen, toilet or bathroom

F24F 2007/003 . using vent ports in a wall

F24F 2007/004 . Natural ventilation using convection

F24F 2007/005 . Cyclic ventilation, e.g. alternating air supply volume or reversing flow direction (F24F 2012/008 takes precedence when there is heat exchange between exhaust and supply air)

F24F 2009/00 **Use of air currents for screening, e.g. air curtain** (air curtains for vehicles B60J 9/04)

F24F 2009/002 . Room dividers

F24F 2009/005 . combined with a door

F24F 2009/007 . using more than one jet or band in the air curtain

F24F 2011/00 **Control or safety systems or apparatus** ({extinguishing or preventing fire A62C 3/14 }; control valves per se F16K ; humidity control G05D 22/00)

F24F 2011/0001 . {for ventilation (F24F 11/0009 takes precedence) }

F24F 2011/0002 .. for admittance of outside air
F24F 2011/0004 ... to create overpressure in a room
F24F 2011/0005 ... to create underpressure in a room, keeping contamination inside
F24F 2011/0006 .. using low temperature external supply air to assist cooling

F24F 2011/0009 . {Electrical control or safety systems or apparatus }
F24F 2011/001 .. {Control systems or circuits characterised by their inputs, e.g. using sensors }
F24F 2011/0012 ... {Air temperature }
F24F 2011/0013 .... of the outside air
F24F 2011/0015 ... {Air humidity }
F24F 2011/0016 .... of the outside air
F24F 2011/0017 ... {Air quality properties }
F24F 2011/0019 .... of the outside air
F24F 2011/002 .... Odor concentration
F24F 2011/0021 .... Ozone concentration
F24F 2011/0023 .... Concentration of air-borne particles
F24F 2011/0024 ..... Tobacco smoke
F24F 2011/0026 .... Carbon dioxide concentration
F24F 2011/0027 .... Carbon monoxide concentration
F24F 2011/0028 .... Oxygen concentration
F24F 2011/003 .... Radon concentration
F24F 2011/0031 .... Electric charge
F24F 2011/0032 .... Volatile organic compound [VOC]
F24F 2011/0034 ... {Occupancy }
F24F 2011/0035 .... Position of occupants
F24F 2011/0036 .... Activity of occupants
F24F 2011/0038 ... Air velocity
F24F 2011/0039 .... of the outside air
F24F 2011/0041 ... Pressure
F24F 2011/0042 .... Air pressure
F24F 2011/0043 .... Heat exchange fluid pressure
F24F 2011/0045 ... Heat exchange fluid temperature
F24F 2011/0046 ... Load
F24F 2011/0047 ... Energy consumption
F24F 2011/0049 ... Sunlight
F24F 2011/005 ... Artificial light
F24F 2011/0052 ... Malfunction
F24F 2011/0053 ... Sound
F24F 2011/0054 ... Condensate
F24F 2011/0056 ... Damper state, e.g. open or closed
F24F 2011/0057 ... using feedback from user
F24F 2011/0058 ... using weather information or forecast

F24F 2011/006 . . {Control systems or circuits characterised by type of control, internal processing or calculations, e.g. using fuzzy logic adaptative control or estimating values }
F24F 2011/0061 . . . using electronic processing
F24F 2011/0063 . . . . using pre-stored data
F24F 2011/0064 . . . . for selecting an operative mode
F24F 2011/0065 . . . . . Sleeping mode
F24F 2011/0067 . . . using one central controller connected to several sub-controllers
F24F 2011/0068 . . . using remote control device
F24F 2011/0069 . . . . using a telephone line
F24F 2011/0071 . . . . using internet communication
F24F 2011/0072 . . . . for programming
F24F 2011/0073 . . . using timers
F24F 2011/0075 . . . for electric energy efficiency or saving
F24F 2011/0076 . . {Control systems or circuits characterised by their outputs, e.g. using a variable flow fan }
F24F 2011/008 . . . {controlling the supply of heat-exchange fluid }
F24F 2011/0082 . . . . using a valve
F24F 2011/0083 . . . . using a variable flow pump
F24F 2011/0084 . . . . monitoring refrigerant leakage
F24F 2011/0086 . . {Control systems or circuits characterised by other control features, e.g. display or monitoring devices }
F24F 2011/0087 . . . for defrosting
F24F 2011/0089 . . . . an outdoor unit
F24F 2011/009 . . . . an indoor unit
F24F 2011/0091 . . . Display or monitoring devices
F24F 2011/0093 . . . . Devices monitoring filter performance
F24F 2011/0094 . . . . for computing energy costs
F24F 2011/0095 . . . Devices triggered by fire, excessive heat or smoke
F24F 2011/0097 . . . . opening air passage in case of fire, excessive heat or smoke
F24F 2011/0098 . . . . closing air passage in case of fire, excessive heat or smoke

F24F 2012/00 **Use of energy recovery systems in air conditioning, ventilation or screening** (with both heat and humidity transfer between supplied and exhausted air F24F 3/147; heat-exchange in general F28)

F24F 2012/001 . {with heat-exchange between supplied and exhausted air }
F24F 2012/002 . . {using an intermediate heat-transfer fluid }
F24F 2012/005 . . . using heat pipes
F24F 2012/007 . . using a by-pass for bypassing the heat-exchanger
F24F 2012/008 . . cyclic routing supply and exhaust air (F24F 2007/005 takes precedence when there is no heat exchange)

F24F 2013/00 **Details common to, or for air-conditioning, air-humidification, ventilation or use of air currents for screening**

F24F 2013/02 . Ducting arrangements
F24F 2013/06 . . Outlets for directing or distributing air into rooms or spaces, e.g. ceiling air diffuser
F24F 2013/0608 . . . Perforated ducts
F24F 2013/0612 . . . Induction nozzles without swirl means
F24F 2013/0616 . . . Outlets that have intake openings

F24F 2013/08 . Air-flow control members, e.g. louvres, grilles, flaps, guide plates (F24F 13/06 takes precedence; roof ventilators F24F 7/02)
F24F 2013/082 . . {Grilles, registers or guards }
F24F 2013/087 . . . using inflatable bellows
F24F 2013/088 . . . Air-flow straightener
F24F 2013/10 . . movable, e.g. damper (F24F 13/18 takes precedence; valves in general F16K)
F24F 2013/14 . . . built up of tilting members, e.g. louvre
F24F 2013/1426 . . . . {characterised by actuating means }
F24F 2013/1433 . . . . . with electric motors
F24F 2013/144 . . . . . with thermoactuators
F24F 2013/1446 . . . . . with gearings
F24F 2013/1453 . . . . . with cables, e.g. bowden cables
F24F 2013/146 . . . . . with springs
F24F 2013/1466 . . . . . with pneumatic means
F24F 2013/1473 . . . . . with cams or levers
F24F 2013/148 . . . . . with magnets
F24F 2013/1493 . . . . using an elastic membrane

F24F 2013/20 . Casings or covers
F24F 2013/202 . . Mounting a compressor unit therein
F24F 2013/205 . . Mounting a ventilator fan therein
F24F 2013/207 . . with control knobs
Mounting controlling members or control units therein

F24F 2013/22 . Means for preventing condensation or evacuating condensate { (for refrigerating devices in general F25D 21/14) }
F24F 2013/221 . . to avoid the formation of condensate, e.g. dew
F24F 2013/222 . . {for evacuating condensate }
F24F 2013/225 . . . by evaporating the condensate in the cooling medium, e.g. in air flow from the condenser
F24F 2013/227 . . . Condensate pipe for drainage of condensate from the evaporator
F24F 2013/228 . . Treatment of condensate, e.g. sterilising

F24F 2013/24 . Means for preventing or suppressing noise { (in perforated ceilings F24F 7/10) }
F24F 2013/242 . . Sound-absorbing material
F24F 2013/245 . . using resonance
F24F 2013/247 . . Active noise-suppression

Guide heading:

F24F 2203/00 **Devices or apparatus used for air treatment**

F24F 2203/02 . System or Device comprising a heat pump as a subsystem, e.g. combined with humidification/dehumidification, heating, natural energy or with hybrid system
F24F 2203/021 . . Compression cycle
F24F 2203/023 . . . with turbine used for expansion
F24F 2203/025 . . . with turbine for compression
F24F 2203/026 . . Absorption - desorption cycle
F24F 2203/028 . . . using a solid absorbing medium

F24F 2203/10 . Rotary wheel
F24F 2203/1004 . . Bearings or driving means
F24F 2203/1008 . . comprising a by-pass channel
F24F 2203/1012 . . Details of the casing or cover
F24F 2203/1016 . . combined with another type of cooling principle, e.g. compression cycle
F24F 2203/102 . . combined with a heat pipe
F24F 2203/1024 . . combined with a humidifier
F24F 2203/1028 . . combined with a spraying device
F24F 2203/1032 . . Desiccant wheel
F24F 2203/1036 . . . Details
F24F 2203/104 . . Heat exchanger wheel
F24F 2203/1044 . . performing other movements, e.g. sliding
F24F 2203/1048 . . Geometric details
F24F 2203/1052 . . comprising a non-axial air flow
F24F 2203/1056 . . comprising a reheater
F24F 2203/106 . . . Electrical reheater
F24F 2203/1064 . . . Gas fired reheater
F24F 2203/1068 . . comprising one rotor
F24F 2203/1072 . . comprising two rotors
F24F 2203/1076 . . comprising three rotors
F24F 2203/108 . . comprising rotor parts shaped in sector form
F24F 2203/1084 . . comprising two flow rotor segments
F24F 2203/1088 . . comprising three flow rotor segments
F24F 2203/1092 . . comprising four flow rotor segments
F24F 2203/1096 . . comprising sealing means

F24F 2203/12 . Dehumidifying or humidifying belt type

Guide heading: **Air-conditioning**

F24F 2221/00 **Details or features not otherwise provided for**

F24F 2221/02 . combined with lighting fixtures

F24F 2221/08 . Installation or apparatus for use in sport halls, e.g. swimming pools, ice rings

F24F 2221/10 . combined with, or integrated in, furniture

F24F 2221/12 . transportable
F24F 2221/125 . . mounted on wheels

F24F 2221/14 . mounted on the ceiling

F24F 2221/16 . mounted on the roof

F24F 2221/17 . mounted in a wall

F24F 2221/18 . combined with domestic apparatus
F24F 2221/183 . . combined with a hot-water boiler
F24F 2221/186 . . combined with a fireplace

F24F 2221/20 . mounted in or close to a window

F24F 2221/22 . Cleaning ducts or apparatus
F24F 2221/225 . . using a liquid

F24F 2221/26 . improving the aesthetic appearance

F24F 2221/28 . using the Coanda effect

F24F 2221/30 . comprising fireproof material

F24F 2221/32 . preventing human errors during the installation, use or maintenance, e.g. goofy proof

F24F 2221/34 . Heater, e.g. gas burner, electric air heater

F24F 2221/36 . Modules, e.g. for an easy mounting or transport

F24F 2221/38 . Personalised air distribution

F24F 2221/40 . HVAC with raised floors

F24F 2221/42 . Mobile autonomous air conditioner, e.g. robots

F24F 2221/44 . Protection from terrorism or theft

F24F 2221/46 . Air flow forming a vortex

F24F 2221/48 . HVAC for a wine cellar

F24F 2221/50 . HVAC for high buildings, e.g. thermal or pressure differences

F24F 2221/52 . Weather protecting means, e.g. against wind, rain or snow

F24F 2221/54 . Heating and cooling, simultaneously or alternatively

F24F 2221/56 . Cooling being a secondary aspect